1104 A.2 1/24/83

153864

RUSSELL & AXON

Established in 1920

Engineers • Planners • Architects

Incorporated

January 24, 1983

Mr. Paul Tandler
Cerro Copper Products Co.
P.O. Box 681
Sauget, IL 62202

Dear Mr. Tandler:

Attached is a lab report provided at Russell & Axon's request from United Survey, Inc., concerning the characteristics of the smoke agent that will be used for smoking the Village's sewers. This smoke testing will commence on January 26, 1983.

This report is provided for your information. Please contact Russell & Axon should you feel any problems would arise by use of this agent, due to interaction with any by-products you may discharge to the Village sewers.

Sincerely,

Gary Morris/wls

Gary K. Morris
SSES Project Engineer

GKM/bsg

cc: John R. Zelle
William L. Sago

Attachment

Scotch® 7664 "Post-it" Routing-Request Pad

ROUTING - REQUEST

Please

- [x] READ
- [ ] HANDLE
- [ ] APPROVE

and

- [ ] FORWARD
- [x] RETURN
- [ ] KEEP OR DISCARD
- [ ] REVIEW WITH ME

To Sandy + Roy B.
Boxe and John [illegible] That the "Smoking" Should Not Have Any Harmful Effects On Us.

Date 1/25/83 From [illegible] T.

319 N. FOURTH STREET, SUITE 7

C03634

erg

January 20, 1977

United Survey, Inc.
25145 Broadway
Oakwood, Ohio 44146

This letter presents data concerning the potential for exposure to various materials as a result of each of two types of smoke generating devices for use in detecting sewer leaks.

Introduction

Both types of smoke generators would normally employ a gasoline driven blower fan to move the smoke into the sewer system.

The United Survey generator uses a smoke agent in an aerosol canister which produces a mist in the hot exhaust of the gasoline motor, which is added to the air blown by the fan. The smoke production rate may be adjusted with a flow control valve, but when wide open, the canister produces smoke for approximately 2 minutes.

The second method of smoke generation employs a fused smoke bomb which is placed at the inlet to the fan or directly into the area being pressurized by the fan. Each bomb produces smoke for approximately 2 minutes.

Potential exposures

Safety considerations of the two smoke generating systems may include:

1. Safe storage of the materials with respect to fire and toxic materials.
2. Exposure through handling or breathing of smoke by employees using the agent, and
3. Homeowners in event that smoke agent enters a home

This project investigates the latter two potential hazards.

ENVIRONMENTAL RESEARCH GROUP, INC. • 7777 EXCHANGE STREET
CLEVELAND • OHIO 44125 TELEPHONE 216/447-0790

Composition of smoke generating agents

Aerosol smoke agent - The composition of the United Survey smoke agent is not known. The liquid material in the aerosol can is likely a mixture of hydrocarbons and/or organic materials, which may exist, as such, in the smoke or may undergo reaction in the hot exhaust manifold and produce secondary products in the airborne smoke.

Additionally, the products of combustion from the gasoline engine are introduced into the smoke. Carbon monoxide is likely the most potentially harmful material in the motor exhaust.

Smoke bomb - The grey powder in a smoke bomb was analyzed for likely constituents. Analysis of chloride and zinc indicated that the major ingredient was zinc chloride. Hexachloroethane was also present in significant quantities. Trace amounts of other materials were present. (Enclosure I)

Criteria for evaluation of potential exposure from smoke

In order to compare the relative potential for exposure to the various materials found in the smoke agents, consideration will be given to the ratio of contaminant concentration in the smoke to the TLV (Threshold Limit Value) for that material. The TLV's for many substances (published by the American Conference of Governmental Industrial Hygienists) are an indication of the 8-hour time weighted average concentration to which an industrial worker should be exposed. Thus, contaminants with a high ratio of concentration to TLV offer greater potential for exposure.

Presentation of Results

Enclosure I indicates the various contaminants which were considered in this study. Concentrations and emission rates of materials in the Aerosol agent are presented based on data previously reported. (ERG letter to Steve Kurucz, August 24, 1976). Emission of materials in the smoke bomb are calculated based on given assumptions.

Of the investigated contaminants, zinc chloride fume offers the greatest ratio , 1490., and hexachlorethane offers the second greatest ratio, 64.5. These ratios from materials in the smoke bomb offer greater ratios than that of carbon monoxide from the aerosol agent.

We have attempted to determine whether, in fact, the hexachloroethane is evolved from the smoke bomb or whether it undergoes chemical reaction to form other materials. To date we have found no evidence to suggest that it does not volatilize and produce airborne emissions as are indicated in Enclosure I. Nevertheless, the zinc chloride in the smoke bomb offers greater health hazard potential than the hexachloroethane.

We caution that this investigation has not included identification of the organic species which may be present in the aerosol. Data collected to date, however, indicates that the smoke bomb offers greater potential for emission of airborne materials which may be a health hazard.

If there are questions concerning these findings, please feel free to contact us.

Sincerely,

Doug Robbins
Regional Operations Manager

Frederick Cooper
Manager of Air Quality Studies

FC/fs
encl.

ENCLOSURE I

Summary of Contaminants in Smoke from Generators

Smoke Generation Type	Fan Air Flow Rate (CFM)	Contaminant	Concentration in Agent	Emission Rate from Generator* (lbs/hr.)	Emission Concentration from Generator*	TLV	Ratio: Concentration to TLV
Aerosol Agent	944	Carbon Monoxide	-	2.1	500.ppm	50.ppm	10.
		Total Hydrocarbons (as methane)	-	1.07	456.ppm	-	-
Smoke Bomb	(944)**	Zinc	33.7	2.5	750.mg/M^3	-	-
		Chloride	37.	2.7	740.mg/M^3	-	-
		Zinc Chloride	70.7	5.2	1490.mg/M^3	1.mg/M^3	1490.
		Hexachloroethane	29.	2.2	645.mg/M^3	10.mg/M^3	64.5
		Magnesium	7100.ppm	.05	14.mg/M^3	-	-
		Arsenic	16. ppm	0.00012	.03 mg/M^3	.5 mg/M^3	.06

C03638

The emission rates and emission concentrations of materials from the smoke bomb are calculated based on 112 grams of powder in each smoke bomb and on 2 minutes duration per bomb. No reaction of hexachloroethane is assumed.

For purposes of comparison similar fan flowrates are assumed.